

Remarks

Claims 1-6, 8-14, and 16-23 are pending in the subject application. By this Amendment, Applicants have amended claims 6, 14, 19, 20, and 23 and added new claims 25-30. Support for the amendments can be found throughout the subject specification and in the claims as originally filed (see, for example, the disclosure of the DOE Isotope Catalog at page 12 of the specification). Entry and consideration of the amendments and new claims presented herein is respectfully requested. Accordingly, claims 1-6, 8-14, and 16-30 are currently before the Examiner. Favorable consideration of the pending claims is respectfully requested.

Prior to the issuance of another Office Action in this matter, Applicants request the courtesy of an interview to discuss the rejections of record in this matter.

Claims 19 and 23 are objected to under 37 CFR 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants respectfully assert that the objection is moot in light of Applicants' present amendment of these claims. With respect to the inclusion of specific isotopes of sulfur in the amendments, Applicants assert that one of skill in the art would recognize that Applicants were in possession of this subject matter in light of Applicants' disclosure of the DOE Isotope Catalog at page 12 of the specification. Accordingly, reconsideration and withdrawal of the objections is respectfully requested.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully assert that the objection is moot in light of Applicants' present amendment of this claim. Accordingly, reconsideration and withdrawal of the objections is respectfully requested.

Claims 1-6, 8-14, 16-19, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lytle *et al.* (J. Microbiological Methods **44** 2001 page 271) in view of Banning *et al.* (Microbiology **149** 2003 page 47) as evidenced by dictionary.com.

Applicants respectfully assert that the claims are not obvious over the cited references. As an initial point, Applicants note that the proposed modification to a prior art reference must not render the prior art unsatisfactory for its intended purpose. See MPEP 2143.01(V) and *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). Applicants respectfully assert that the purpose

disclosed by Lytle *et al.* is measuring bacterial transport in the subsurface. (See introduction at page 271, wherein it is said that “[t]racing bacterial movement through subsurface sediments has been problematical” and the disclosure is represented as a solution to that problem. See also the abstract, wherein it is said that the labeled bacteria are “used as measures of bacterial transport in the subsurface”.) Lytle *et al.* disclose that an adhesion-deficient (*i.e.*, easily transported) indigenous bacterium is isolated (see bridging paragraph at pp. 272-73) and experiments are conducted to test the feasibility of *ex situ* labeling of the bacterium, reintroduction *in situ*, transport through subsurface sediments, and detection (via the label) at a location remote from the point of reintroduction (see page 273 *et seq.*).

If one were to adapt Lytle *et al.* to *in situ* labeling in the manner of the claimed invention, then little or no transport or movement of bacteria in a subsurface would occur. Claim 1 indicates that a biofilm is established on the solid support; however, microbes attached in a biofilm are not freely movable and thus would not be expected by one of skill in the art to be easily transported through subsurface sediments and detected at a location remote from the site of *in situ* labeling. Thus, Applicants respectfully assert that the purpose of Lytle *et al.* would be frustrated if modified in the manner claimed in the instant application.

Applicants also respectfully reiterate and expand their previous assertions with respect to lack of a reasonable expectation of success. The Supreme Court has observed that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739, 167 L.Ed.2d 705 (2007). The Court also noted, however, that “[a]lthough common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. *Id.* at 1741. In performing this analysis, one must also inquire as to whether “a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention and whether there would have been a reasonable expectation of success in doing so.” *DyStar Textilfarben GmbH v. C.H. Patrick Co.*, 464 F.3d 1356, 1360 (Fed.Cir.2006) (quoting 35 U.S.C. § 103(a)), cert. denied, 127 S.Ct. 2937.

In the case of this combination of references, it is respectfully submitted that one of ordinary skill in the art would not have had a reasonable expectation of success in arriving at the claimed invention. As noted in the Office Action, the Lytle *et al.* reference utilizes adhesion deficient gram-negative bacteria. As such, these organisms would not have been able to establish a biofilm on a solid support as they would be unable to adhere to the support. Since these adhesion deficient microorganisms would not have been adherent to the solid support, one would not have been able to identify biomarkers on the solid support into which isotope labeled components had been incorporated nor would one have been able to correlate the biomarkers with particular microbes or subsets of microbial organisms at a site. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has not been established for the claimed invention and reconsideration and withdrawal of the rejection is respectfully requested.

The Office Action considers that Johnson *et al.* (Applied and Environmental Microbiology October 2001 page 4908) teach that DA001 was “grown on acetate (solid support)” thus indicating that biofilms of these bacteria can be grown; however, Applicants respectfully dispute this conclusion. The cited paragraph (p. 4908 2nd column 1st paragraph) gives no indication that the acetate medium referred to is a solid medium or that a biofilm is formed. Indeed, the paragraph indicates that the acetate-grown cultures “were harvested by centrifugation”, thus indicating to one of ordinary skill in the art that the acetate-containing medium is a liquid medium.

Applicants further respectfully submit that one of ordinary skill in the art would not have had a reasonable expectation of success in arriving at the claimed invention because the solid surface supposedly taught by Lytle *et al.* is a sealed tube containing an isotope enriched liquid medium (see page 273). Were this sealed tube placed at a subsurface location, the microbial community at the location would come in contact with only the exterior of the tube and would not come in contact with the isotope enriched medium (substrate); hence, biomarkers would not be produced that incorporate the isotopes nor would the microbial community at the subsurface site or down-well groundwater site come into contact with the substrate enriched with isotopes.

Finally, Applicants note that all the claim limitations must be taught or suggested by the prior art in order to establish the *prima facie* obviousness of a claimed invention. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). For example, the references fail to teach contacting a

microbial community at/in a subsurface site or in a down-well groundwater site. Additionally, it is respectfully submitted that none of the references teach that a sterile solid support loaded or coated with a substrate is to be incubated in a subsurface site or a down-well groundwater site for a period of time sufficient to establish a biofilm of microbes from the microbial community on the solid support. The Office Action appears to argue that Banning supplies this element, but Applicants respectfully assert that any “groundwater” biofilms analyzed in Banning appear to have been generated *ex situ* in the laboratory rather than *in situ* at a subsurface site or down-well groundwater site as is required by the claims. Accordingly, reconsideration and withdrawal of the rejection of record is respectfully requested.

Claims 1-6, 9-14, and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elasri *et al.* (Applied and Environmental Microbiology May 1999 page 2025) in view of Banning *et al.* (Microbiology **149** 2003 page 47) as evidenced by dictionary.com.

As noted above, it is well-established that all of the claim limitations must be taught or suggested by the prior art in order to establish the *prima facie* obviousness of a claimed invention. The Office Action again relies on Banning to teach contacting a microbial community at/in a subsurface site or in a down-well groundwater site; Banning is further relied on to teach that a sterile solid support loaded or coated with a substrate is to be incubated in a subsurface site or a down-well groundwater site for a period of time sufficient to establish a biofilm of microbes from the microbial community on the solid support. Applicants respectfully reiterate that any “groundwater” biofilms analyzed in Banning appear to have been generated *ex situ* in the laboratory rather than *in situ* at a subsurface site or down-well groundwater site. Thus, this limitation of the independent claims does not appear to have been taught by the combination of cited references.

Likewise, it is not clear that either reference teaches “identifying biomarkers into which isotopes from said substrate have been incorporated”. While the Office Action considers that the strontium disclosed by Elasri may meet the definition of “isotope”, Elasri contains no indication that strontium is incorporated into “the long fatty acid aldehyde” that the Office Action considers to be “the biomarker which is detected”. To the contrary, Elasri appears to indicate that the function of the strontium chloride is to cause cross-linking of alginate so as to form beads (see page 2025 last paragraph). Thus, it is respectfully submitted that the combination of references fails to render the

claims *prima facie* obvious and reconsideration and withdrawal of the rejection is respectfully requested.

It should be understood that the amendments presented herein have been made solely to expedite prosecution of the subject application to completion and should not be construed as an indication of Applicants' agreement with or acquiescence in the Examiner's position. Applicants expressly reserve the right to pursue the invention(s) disclosed in the subject application, including any subject matter canceled or not pursued during prosecution of the subject application, in a related application.

In view of the foregoing remarks and amendments to the claims, Applicants believe that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account No. 19-0065.

Applicants invite the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephonic interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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